Chapter Three
FACILITY REQUIREMENTS

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To plan for the future of Cottonwood Municipal Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that will adequately serve these needs. This chapter uses established planning criteria to determine the airside (i.e., airfield capacity, runways, taxiways, navigational aids, marking and lighting), and landside (i.e., hangars, terminal building, aircraft parking apron, fueling, automobile parking and access) facility requirements.

Two fundamental planning procedures are utilized in the facility requirements analysis: the demand capacity analysis, and the determination of airport development needs. The objective of this effort is to identify deficiencies in existing facilities and outline which new facilities will be needed to accommodate forecast demands. Having established the facility requirements, alternatives for providing necessary facilities are evaluated to determine the most cost-effective and efficient means for implementation.

AIRFIELD CAPACITY

METHODOLOGY

A variety of techniques have been developed for the analysis of airfield capacity. The current methodology, accepted by the Federal Aviation Administration (FAA) and employed in this study, is based on FAA Advisory Circular 150/5060-5, Airport Capacity and Delay. With this methodology, airfield runway capacity is described by the following three terms.

- **Hourly Capacity of Runways:** The maximum number of aircraft operations that can take place on the runway system in one hour.

- **Annual Service Volume:** The annual capacity or a maximum level of annual aircraft operations that may be used as reference in planning the runway system.

- **Annual Aircraft Delay:** The total delay incurred by all aircraft on the airfield in one year.

The capacity of an airport is determined by several factors. Among these are airfield layout, meteorology, runway use, aircraft mix, percent arrivals, percent touch-and-gos and exit taxiway locations. Each of these elements and its impact on airfield capacity is discussed in the following paragraphs.

Airfield Layout

The airport layout refers to the location and orientation of runways, taxiways and the terminal area. As illustrated on **Exhibit 1B**, the layout of Cottonwood Municipal Airport consists of one runway oriented northwest southeast. Runway 14-32 has a partial parallel taxiway and one taxiway that is qualified as an *exit* taxiway. The parallel taxiway ends at a taxiway stub, which connects the runway, parallel taxiway, and the south side of the apron. The fixed based operator, T-shades and tiedowns are located on the west side of the runway in this apron area.

Meteorology

Weather conditions can affect runway utilization due to changes in cloud ceilings and visibility. When weather conditions deteriorate below Visual Flight Rule (VFR) conditions, the instrument capacity of the airport becomes a factor in determining airport capacity. During Instrument Flight Rule (IFR) conditions, separations between aircraft increases in length and the capabilities of the airfield system to accept operations is reduced.

The **Airfield Capacity and Delay Advisory Circular (AC 150/5060-5)** recognizes three categories of ceiling and visibility minimums. VFR conditions occur whenever the cloud ceiling is at least 1,000 feet above ground level and the visibility is at least 3 statute miles. IFR conditions occur whenever the reported cloud ceiling is at least 500 feet but less than 1,000 feet and/or visibility is at least one statue mile but less than three statue miles. Poor Visibility and Ceiling (PVC) conditions exist whenever the cloud ceiling is less than 500 feet and/or visibility is less than one statue mile.

At Cottonwood Municipal Airport, VFR conditions occur approximately 98 percent of the time. There is no available data on the annual percentage of IFR and PVC conditions at the airport, but it is estimated to be minimal based upon the typical weather associated with the region.

Aircraft Mix

The airside capacity methodology identifies four classes into which aircraft are categorized. Classes A and B include small propeller aircraft and jets, weighing 12,500 pounds or less. Classes C and D consists of large jet and propeller aircraft generally associated with airline and military use. The aircraft operational mix used in calculating the capacity of Cottonwood Municipal Airport, based upon the forecasts of aviation demand, is presented in **Table 3A** and illustrated on **Exhibit 3A.**

AIRCRAFT CLASSIFICATIONS

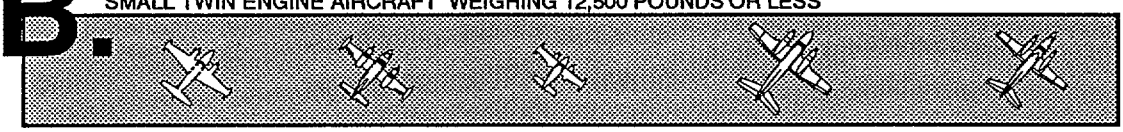
AIRCRAFT CLASSIFICATION

REPRESENTATIVE TYPES OF AIRCRAFT DESCRIPTION

A. SMALL SINGLE ENGINE AIRCRAFT WEIGHING 12,500 POUNDS OR LESS

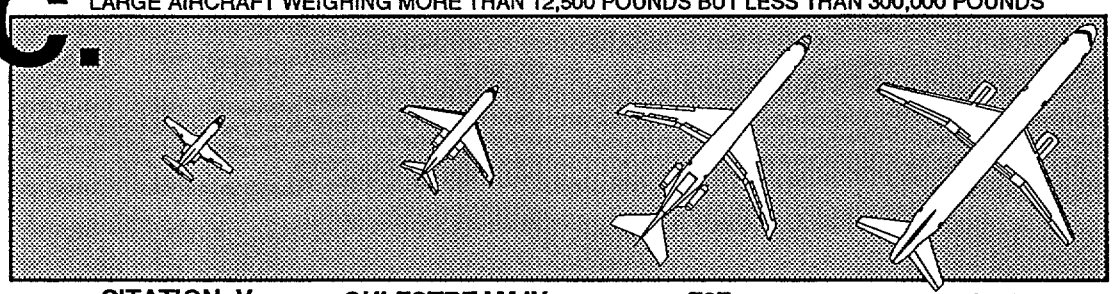
PA-18 C-150 C-180 C-210 BONANZA

B. SMALL TWIN ENGINE AIRCRAFT WEIGHING 12,500 POUNDS OR LESS



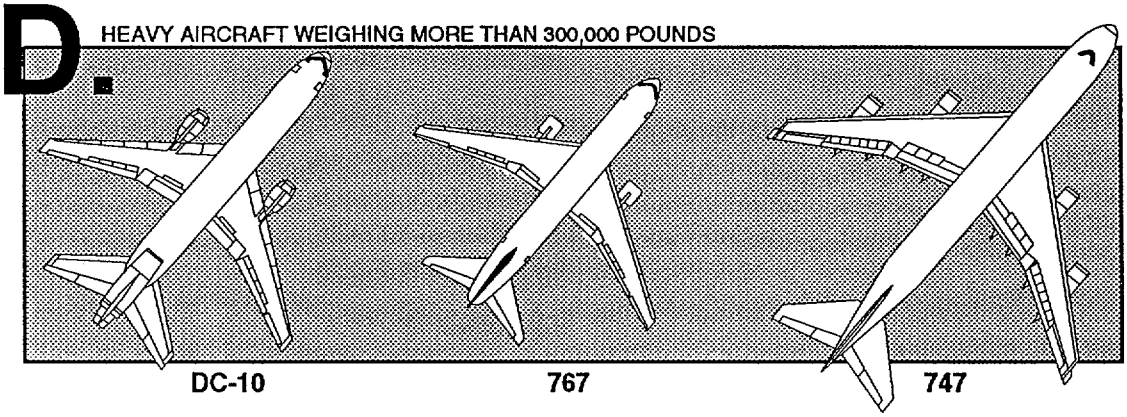
PA-31 C-402 C-310 KING AIR BEECHCRAFT 99

C. LARGE AIRCRAFT WEIGHING MORE THAN 12,500 POUNDS BUT LESS THAN 300,000 POUNDS



CITATION V GULFSTREAM IV 727 757

D. HEAVY AIRCRAFT WEIGHING MORE THAN 300,000 POUNDS



DC-10 767 747

1. WEIGHTS REFER TO MAXIMUM CERTIFIED TAKE OFF WEIGHT.
2. HEAVY AIRCRAFT ARE CAPABLE OF TAKE OFF WEIGHTS OF 300,000 POUNDS OR MORE WHETHER OR NOT THEY OPERATE AT THIS WEIGHT.

Cottonwood ARIZONA

Exhibit 3A
AIRCRAFT CLASSIFICATIONS

TABLE 3A
Aircraft Operational Mix Forecast
Cottonwood Municipal Airport

Year	Aircraft Classification A	B	C	D
1991	99%	1%	0%	0%
1995	97%	3%	0%	0%
2000	96%	4%	0%	0%
2005	95%	5%	0%	0%
2010	94%	6%	0%	0%
2015	93%	7%	0%	0%

Typical Aircraft by Classification:

Class A: Small single-engine, gross weight 12,500 pounds or less

Examples:
Cessna 172/182
Beech Bonanza
Mooney 201
Piper Cherokee/ Warrior

Class B: Small, twin-engine, gross weight 12,500 pounds or less

Examples:
Beech 1300
Cessna 402
Lear 25
Beechcraft 99
Mitsubishi MU-2
Piper Navajo
Rockwell Shrike
Cessna Citation

Class C: Large aircraft, gross weight 12,500 pounds to 300,000 pounds

Examples:
Douglas DC-9
Boeing 727
Boeing 757
Gulfstream III
DeHavilland DH-8
Swearingen Metro
Beech King Air 200
Boeing 737
Boeing 767
Citation II
Lear 35/55
Beech 1900

Class D: Large aircraft, gross weight more than 300,000 pounds

Examples:
Lockheed L-1011
Boeing 747
Douglas DC-8-60/70
Airbus A-300/A-310

Percent Arrivals

The percent of arrivals has an influence on the capacity of runways. In most cases the higher the percentage of arrivals during the peak period, the lower the service volume. At Cottonwood Municipal Airport, there was no information that indicated a disproportionate share of arrivals to departures during peak periods. Therefore, it was assumed that arrivals equal departures during peak periods.

Touch-And-Go Operations

A touch-and-go refers to an aircraft which lands then makes an immediate takeoff without coming to a full stop or exiting the runway. These operations are normally associated with training and are classified as local operations. Touch-and-go's currently comprise approximately 70 percent of all operations at the airport. This percentage is expected to decrease during the planning period to approximately 55 percent of the total operations.

Exit Taxiways

In addition to the runway configuration, the most notable characteristic considered in the airside capacity model, are the number and types of taxiways available to exit the runway. The location of *exit* taxiways affects the occupancy time of an aircraft on the runway. The longer a plane remains on the runway, the lower the capacity of that runway. The aircraft mix index determines the distance the taxiway must be located from the runway end to qualify as an *exit* taxiway. Only those exits located between 2,000 and 4,000 feet of the runways ends qualify as *exit* taxiways in the capacity analysis. There is only one qualified *exit*

taxiway for approaches to either Runways 14 or 32.

CAPACITY ANALYSIS

The preceding information was used in conjunction with the airside capacity model to determine the operational capacity at Cottonwood Municipal Airport. Operational capacity is expressed in three terms.

- Hourly Capacity of the Runway
- Annual Service Volume
- Annual Aircraft Delay

From these results, it is possible to determine the adequacy of the current airfield to accommodate potential demand scenarios and to determine the range of aircraft delay associated with each demand level.

Hourly Runway Capacity

The first step in capacity analysis involves the computation of an hourly runway capacity during VFR and IFR conditions. Because of increased separations required between aircraft under IFR conditions, VFR hourly capacity is normally much higher. From these calculations, a weighted hourly capacity can be calculated.

The airfield capacity is influenced by the runway configuration. Parallel runway systems provide greater airport capacity than a single runway or two intersecting runways. As illustrated in **Table 3B**, the weighted VFR hourly capacity for the existing runway system is 128 operations. This hourly capacity is expected to remain constant throughout the planning period.

Annual Service Volume

Once the hourly capacity is known, the annual service volume (ASV) can be determined. The ASV under VFR conditions was calculated by the following equation.

$ASV = C \times D \times H$

C = weighted hourly capacity

D = ratio of annual demand to average daily demand during the peak month

H = ratio of average daily demand during the peak month

The existing weighted hourly capacity (C) as determined earlier is 128 operations for Cottonwood Municipal Airport. The daily demand ratio (D) is determined by dividing the annual operations by average daily operations during the peak month. The hourly ratio (H) is determined as the inverse of the percent of daily operations occurring during the peak hour. The data used for these ratios was based on the peaking characteristics developed in the Forecast Chapter.

The projected ASV for Cottonwood Municipal Airport is 255,200 operations throughout the planning period. This ASV indicates that the airport is currently operating at approximately 8 percent of annual capacity and would be expected to reach 17 percent by the year 2015. Since the forecast demand level is much less than the available capacity, "significant" delays are not anticipated on a regular basis to aircraft operating at the airport.

Annual Delay

Even before an airport reaches capacity, it begins to experience certain amounts of delay to aircraft operations. Delays occur to arriving traffic that must wait in the VFR traffic pattern on in the IFR holding pattern awaiting their turn to land. Departing traffic must hold on the taxiway or the holding apron while waiting for the runway and final approach to be clear.

As an airport's operations grow towards capacity, delay increases exponentially. With 19,410 annual operations estimated for 1991, Cottonwood Municipal Airport is currently at 8 percent of capacity. This translates to an average delay per aircraft of less than 0.1 minutes. Actual delays to individual aircraft can be as high as ten times this average value. At present operations levels, total aircraft delay at Cottonwood Municipal Airport is 32 hours annually. When the airport reaches roughly 43,810 operations, as forecast for 2015, delays will still average less than one minute per aircraft and will total only 71 hours annually.

Conclusions

Table 3B provides a summary of the operational capacity and delay analysis for Cottonwood Municipal Airport. The airport's operational capacity is not expected to become a constraining factor to the future growth of the airport.

Although an increase in runway capacity is not justified by the anticipated demand, planning for such an occurrence should be initiated when the annual demand approaches 60 percent of the annual service volume.

TABLE 3B
Airfield Demand/Capacity and Delay Summary
Cottonwood Municipal Airport

Year	Annual Operations	Design Hour Operations	VFR Hourly Capacity	Annual Service Volume	Average Delay Per Operation (Minutes)	Total Annual Delay (Hours)
1991	19,410	10	128	255,200	<.1	32
1995	24,910	12	128	255,200	<.1	40
2000	28,810	15	128	255,200	<.1	46
2005	33,310	17	128	255,200	<.1	54
2010	38,510	19	128	255,200	<.1	62
2015	43,810	22	128	255,200	<.1	71

AIRSIDE FACILITY REQUIREMENTS

Airside facilities are those that are related to the arrival and departure of aircraft. These facilities are comprised of the following items.

- Runways
- Taxiways
- Navigational Aids
- Marking and Lighting

The selection of the appropriate FAA design standard for the development of airfield facilities is based primarily upon the characteristics of the aircraft which are expected to use the airport. The most critical aircraft characteristics are approach speed and the size of the aircraft anticipated to use the airport both today and in the future. The planning for future aircraft use is particularly important because design standards are used to determine separation distances between facilities that could be extremely costly to relocate at a later date.

According to **FAA Advisory Circular 5300-13, Airport Design**, aircraft are grouped into five categories based upon their certificated approach speed. Categories A and B include small, propeller aircraft and certain smaller business jets, all of which will have approach speeds of less than 121 knots. Categories C, D, and E consist of the remaining business jets as well as larger jet and propeller aircraft generally associated with commercial and military use.

The same advisory circular also describes six Airplane Design Groups (ADG's) according to the physical size of the aircraft. The airplane's wingspan is the principal characteristic affecting design standards. ADG's range from Group I for small aircraft with wingspans less than 49 feet, to Group VI for wingspans of the largest aircraft. The majority of aircraft expected to use the Cottonwood Municipal Airport would be in ADG I and II (wingspans less than 79 feet).

The Airport Reference Code (ARC) is a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport. The ARC has two components to the airport design aircraft. The first component, is the aircraft approach category, which is related to the aircraft approach speed (operational characteristics). The second component is the ADG which relates to airplane wingspan (physical characteristics). Generally, aircraft approach speed applies to runways and runway related facilities. Airplane wingspan primarily relates to separation criteria involving taxiways and taxilanes.

Based on the forecasts described in Chapter Two, and in accordance with the design criteria established in **FAA Advisory Circular 150/5300-13**, the Cottonwood Municipal Airport will have an ARC of B-II throughout the planning period.

Airport design criteria are more specifically determined by analyzing the aircraft mix and determining the most demanding airplane(s) to be accommodated. Although one type of aircraft may determine runway length, another may determine runway pavement strength or other appropriate design parameters. The following paragraphs detail the criteria used to establish airfield dimensions and requirements.

RUNWAY

The adequacy of the existing runway system at Cottonwood Municipal Airport has been analyzed from a number of perspectives, including runway length, width, orientation and pavement strength. From this information, requirements for runway improvements were determined for the airport.

Runway Length

The determination of runway length requirements for the airport are based on four primary factors.

- Critical aircraft type expected to use the airport.
- Mean maximum daily temperature of the hottest month.
- Runway gradient.
- Airport elevation.

The recommended length for a runway is determined by considering either the family of airplanes having similar performance characteristics or a specific airplane needing the longest runway. In either case, the choice should be based on airplanes that are forecast to use the runway on a regular basis. According to FAA Advisory Circular 150/5325-4A - Runway Length Requirements for Airport Design, a "regular basis" is considered to be at least 250 operations a year. An analysis of the existing and future fleet mix indicates that small jet aircraft will be the most demanding aircraft on runway length at Cottonwood Municipal Airport.

Aircraft operating characteristics are affected by three primary factors. They are the mean maximum temperature of the hottest month, the airport's elevation, and the gradient of the runway. The mean maximum temperature of the hottest month is 98.4 degrees Fahrenheit. The airport elevation is 3,550 feet MSL and the runway gradient is 0.99 percent.

Table 3C outlines the runway length requirements for various categories of aircraft. The length of Runway 14-32 is currently 4,250 feet, which is capable of accommodating only 75 percent of small aircraft with less than 10 seats. At Cottonwood Municipal Airport, overrun areas on each end of the runway provide for landing distance available (LDA), of 4,550 feet. While consideration should be given to providing approximately 5,000 feet of runway length to increase the usability to 95 percent of small aircraft, the surrounding constraints may not make this feasible. This will be further examined in the Alternatives Chapter.

TABLE 3C
Runway Length Requirements
Cottonwood Municipal Airport

AIRPORT AND RUNWAY DATA

Airport Elevation	3,550 MSL
Mean daily maximum temperature of the hottest month	98.4°F
Maximum difference in runway centerline elevation	42 feet

RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN

Small airplanes with less than 10 passenger seats:	
75 percent of these small airplanes	3,950 ft
95 percent of these small airplanes	5,010 ft
100 percent of these small airplanes	5,400 ft
Small airplanes with less than 10 passenger seats	5,400 ft
Large airplanes of 60,000 pounds or less:	
75 percent of these large airplanes at 60 percent useful load	6,580 ft
75 percent of these large airplanes at 90 percent useful load	9,020 ft
100 percent of these large airplanes at 60 percent useful load	9,110 ft
100 percent of these large airplanes at 90 percent useful load	10,970 ft

A small airplane is an airplane of 12,500 pounds or less maximum takeoff weight.
A large airplane is an airplane of more than 12,500 pounds maximum takeoff weight.

REFERENCE: AC 150/5300-13, **Airport Design,** dated June 5, 1991.

Runway Width

According to **FAA Advisory Circular 150/5300-13,** a minimum runway width of 75 feet would meet the requirements over the planning period. It is, therefore, anticipated that the existing 75 foot width will be adequate throughout the planning period.

Runway Orientation

Wind conditions are of prime importance in determining runway orientation. Where prevailing winds are consistently from one direction, runways are generally oriented in that direction. In most areas, however, consistency of wind direction is not found. In such instances, a multiple runway system may be required. The Federal Aviation Administration (FAA) has established guidelines indicating that an airport runway system should provide 95 percent usability of the runway. The 95 percent wind coverage is computed on the basis of the crosswind not exceeding 10.5 knots for Airport Reference Codes (ARC) A-I and B-I, 13 knots for ARC A-II and B-II. According to the windrose illustrated on **Exhibit 1E,** Runway 14-32 does not meet the 10.5 knot

wind coverage, but does meet the 13 knot wind coverage. Since this wind information was not collected at Cottonwood Municipal Airport, it is not recommended that a crosswind runway be planned until site specific wind information can be gathered for a minimum of one year. Discussions with the airport operator, FBO staff and airport users, indicated that there is not a current demand for a crosswind runway at Cottonwood Municipal Airport.

Runway Pavement Strength

As previously identified in the Inventory Chapter, Runway 14-32 has a pavement strength of approximately 30,000 pounds single wheel loading (SWL). The existing runway strength does meet the needed strength to accommodate all forecasted aircraft activity.

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movement to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield.

According to **FAA Advisory Circular 150/5300-13, Airport Design**, the taxiways should be 35 feet in width and provide a 240 foot separation between the runway and taxiway centerlines. All the taxiways at Cottonwood Municipal Airport are 40 feet in width, which will accommodate the aircraft mix forecast throughout the planning period. However, the current taxiway separation is 150 feet, which does not satisfy the separation standards. Consideration should be given to relocating the parallel taxiway to provide the standard, 240 foot separation. All taxiways should maintain the same pavement strength as the runway.

NAVIGATIONAL AIDS

Airport and runway navigational aid requirements are based on recommendations as depicted in **DOT/FAA Handbook 7031.2C, Airway Planning Standards Number One**, and **FAA Advisory Circular 150/5300-13, Airport Design.** Navigational aids provide visual, non-precision, or precision guidance to a runway(s) or the airport itself. The basic difference between a non-precision and precision navigational aid is that the latter provides electronic decent, alignment (course), and position guidance, while the non-precision navigational aid provides only alignment and position location information. The necessity of such equipment is predicated on safety considerations and operational needs. The type, purpose, and volume of aviation activity expected at the airport are factors normally used in the determination of the airport's eligibility for navigational aids.

Glide path indicator lights are a system of lights which provide visual descent guidance information during an approach to the runway. Currently, both runways are equipped with Precision Approach Path Indicators (PAPI). Another landing aid that is used at airports are the Runway End Identification Lights (REIL's), which are installed at the runway ends. These strobe lights assist in identifying the runway during low visibility conditions and at night. It is recommended that REIL's be installed on Runway 14 by the year 2005 and the REIL's on Runway 32 be repaired early in the planning period.

A non-precision instrument approach should be considered for the Cottonwood Municipal Airport utilizing an on airport Non-Directional Beacon (NDB). However, in the interim, a VFR circle-to-land procedure should be established utilizing the Sedona NDB, located approximately 12 NM northeast of the Cottonwood Municipal Airport.

MARKING AND LIGHTING

Lighting on runways, taxiways, and aprons is used to provide safety and security for aircraft movements during night operations. A rotating beacon, and Medium Intensity Runway Lights (MIRL) are installed at the airport and the existing runway is currently marked with visual markings. Medium Intensity Taxiway Lights (MITL) should be added in the future. Should an instrument approach procedure be established at the airport, it will require that the runway be marked accordingly (non-precision or precision markings).

Exhibit 3B, at the end of this chapter, provides a summary of the Airside requirements illustrated in this section. A discussion of landside facility requirements for Cottonwood Municipal Airport follows.

LANDSIDE FACILITY REQUIREMENTS

Components of the general aviation landside complex include the following types of facilities.

- Hangars
- Local and Itinerant Apron
- Terminal Building
- Vehicle Parking
- Fuel Storage

HANGARS

The space required for hangar facilities is dependent upon the number and type of aircraft expected to be based at the airport. Based upon an analysis of general aviation facilities and the current demand at Cottonwood Municipal Airport, percentages representing hangar requirements for various types of general aviation aircraft have been calculated.

General aviation airports have been experiencing an increasing trend toward the use of T-hangars. Not only are T-hangars less expensive to construct, they provide the aircraft owner more privacy and greater ease in obtaining access to the aircraft. The principal uses of conventional hangars at general aviation airports are for large aircraft storage, storage during maintenance and for housing fixed based operators activities.

For planning purposes, it was assumed that 80 percent of the single engine aircraft, 90 percent of the twin engine aircraft and 100 percent of the helicopters and turbine powered aircraft would desire hangars. Although there are currently no aircraft hangars available at Cottonwood Municipal Airport, it is estimated that 70 percent of the based single engine aircraft tenants would utilize T-Shades. It was also assumed that all of the helicopters and turbine powered aircraft would be stored in conventional hangars.

A planning standard of 1,500 square feet (SF) was used for T-hangars. Space requirements for conventional hangar space were based on 1,000 SF per single engine and rotary wing aircraft, 2,000 SF per turboprop aircraft, and 2,500 SF per jet aircraft. In addition, service or maintenance hangar areas were estimated

at 10 percent of the total hangar storage area. This maintenance hangar area will be in addition to the individual hangar facilities.

Table 3D outlines the projected hanger requirements throughout the planning period.

TABLE 3D
Forecast Hangar and Hangar Apron Requirements
Cottonwood Municipal Airport

	Available	1991	1995	2000	2005	2010	2015
Based Aircraft	N/A	29	33	38	44	51	58
Aircraft to be Hangared/Shaded							
Single Engine	N/A	22	25	28	30	34	37
Multi Engine	N/A	1	2	2	4	5	6
Turboprop	N/A	0	0	1	1	2	2
Business Jet	N/A	0	0	0	0	0	1
Rotorcraft	N/A	0	0	0	1	1	2
Total	N/A	23	27	31	36	42	48
T-Hangar Positions	0	8	11	12	15	18	20
T-Shade Positions	12	15	18	20	21	24	26
Conventional Hangar Positions	N/A	0	0	1	2	3	5
Conventional Hangar Area (s.f.)							
Aircraft Storage	0	0	0	2,000	3,000	5,000	8,500
Aircraft Maintenance	2,400	1,200	1,400	1,500	2,000	2,300	2,600
T-Hanger Area (s.f.)	0	12,000	13,500	15,000	19,500	22,500	25,500
T-Shade Area (S.F.)		22,500	2,7000	30,000	31,500	36,000	39,000

AIRCRAFT PARKING APRON

Adequate aircraft parking apron should be provided to accommodate those local aircraft not stored in hangars as well as transient aircraft. At Cottonwood Municipal Airport, the local and transient aircraft are parked in the same area. There are currently 39 local tiedowns and 4 transient tiedowns in the apron area.

In determining future apron requirements, it is necessary to examine local and transient tiedown facilities as separate entities. The local apron should at least meet the demand established by the unhangared (and/or uncovered) based aircraft. The number of based aircraft requiring local tiedown facilities was determined and the results depicted in Table 3E. There are sufficient local tiedowns at Cottonwood Municipal Airport

to meet the demand through the year 2010, at which time additional tiedowns would be needed.

Transient parking requirements can be determined from a knowledge of busy-day operations. The number of transient spaces required at Cottonwood Municipal Airport was determined to be about 50 percent of the busy-day itinerant operations. A planning criterion of 300 square yards (SY) per local aircraft and 360 SY per transient aircraft was used for the analysis presented in Table 3E. The analysis indicates that 4 additional transient tiedowns will be needed by the end of the planning period.

TABLE 3E
Forecast Apron Requirements
Cottonwood Municipal Airport

	Available	1991	1995	2000	2005	2010	2015
Total Tiedowns	43	13	19	23	31	38	47
Local	39	6	8	10	14	17	21
Transient	4	7	11	13	17	21	26
Total Aircraft Apron (SY)	13,100	4,400	6,400	7,700	10,400	12,700	15,700

TERMINAL BUILDING

The terminal building serves several functions at an airport. Space is required for administrative and management offices, pilot's lounge and flight planning area, meeting facilities, foods services, storage, restrooms, airline offices, baggage areas and various other needs. This space is not necessarily limited to a single building, but in the case of Cottonwood Municipal Airport, a single-structure FBO office serves the terminal functions available at the airport.

The methodology utilized to evaluate terminal building capacity generally calculates the square footage requirements for terminal facilities based on the number of design hour pilots and passengers forecast to use the facility. Table 3F outlines the space requirements for a terminal building facility at Cottonwood Municipal Airport during the planning period.

Plans have been prepared for a new 1,700 square foot terminal facility at Cottonwood Municipal Airport. A review of these plans, in consideration of the space needs identified in Table 3F, indicates that the plans would provide adequate space through the year 2010. Since these numbers are only estimates of terminal facility requirements, these areas should be examined for facility capacity as the demand rises.

TABLE 3F
Terminal Building Requirements
Cottonwood Municipal Airport

	Available	1991	1995	2000	2005	2010	2015
Design Hour Pilots and Passengers	N/A	3	9	12	15	18	23
Terminal Building (Sq. Ft.)	0*	800	950	1,200	1,400	1,700	1,900

*Space provided by FBO

AUTOMOBILE PARKING

The requirements for automobile parking at general aviation airports are largely dependent upon the operation levels in addition to the type of general aviation facilities and activities at the airport. General aviation terminal area parking facilities are determined under guidelines set forth in FAA publications, while the number of automobile parking spaces for other general aviation facilities is based on other factors.

The terminal public parking area requirements were based upon the number of design hour pilots and passengers. The total number of parking positions was projected on the basis of 1.3 spaces per design hour passenger and 350 square feet per automobile parking space.

General aviation parking requirements are based on the assumption that 25 percent of the based aircraft will require automobile parking positions at any one time. The amount of parking area required per space is the same as in determining terminal area parking requirements. Table 3G reflects parking facilities that are currently available and those that will be required in the future.

TABLE 3G
Automobile Parking Requirements
Cottonwood Municipal Airport

	Available	1991	1995	2000	2005	2010	2015
Pilots and Design Hour Passengers	N/A	3	9	12	15	18	23
Terminal Vehicle Spaces	4	4	12	16	20	23	30
Parking Area (Sq Ft)	1,400	1,400	4,200	5,600	7,000	8,100	10,500
General Aviation Spaces	5	7	8	10	11	13	15
Parking Area (Sq Ft)	1,750	2,450	2,800	3,500	3,850	4,550	5,250
Total Parking Area Requirements (Sq Ft)	3,150	3,850	7,000	9,100	10,850	12,650	15,750

FUEL STORAGE

Fuel at airports is normally stored in underground tanks. The practice has undergone a great deal of scrutiny in the past few years because of the potential for fuel leaks and contamination of soil and groundwater. Consequently, the installation, design and monitoring requirements from both the State and Federal government related to underground fuel storage have increased significantly.

The location of the fuel storage area depends upon the airport's operational activity and management procedures. Remote location of the fuel storage facility will require the use of a servicing vehicle to make the fuel available to the aircraft.

Future fuel storage requirements for Cottonwood Municipal were projected following an analysis of the historical fuel use characteristics at the airport for the past two years. The average rate of fuel consumption for this period was 1.34 gallons per operation. This ratio can be expected to increase as the size of the fleet mix increases.

Table 3H shows an estimate of the monthly capacity of fuel storage that will be required at Cottonwood Municipal Airport. Storage requirements are based on a one month on-hand supply, however, more frequent deliveries can reduce this requirement. As indicated in **Table 3H**, the current fuel storage capacity of 10,000 gallons is adequate to meet the fuel storage requirements through the year 2010. It is recommended that an additional storage tank be installed for the storage of Jet A fuel when the demand to maintain this fuel at the airport exists.

The landside facility requirements that should be developed during the planning period are illustrated in **Exhibit 3C**, at the end of this chapter.

TABLE 3H
Fuel Storage Requirements
Cottonwood Municipal Airport

	Available	1991	1995	2000	2005	2010	2015
Annual Operations	N/A	19,410	24,910	28,810	33,310	38,510	43,810
Peak Month Operations	N/A	2,330	2,980	3,464	3,948	4,644	5,240
Average Fuel Ratio	N/A	1.34	1.4	1.6	1.8	2.0	2.2
Monthly Fuel Storage Requirements	10,000*	3,100	4,200	5,500	7,100	9,300	11,500

* Fuel Storage Currently Available

SUPPORT FACILITIES

AIRPORT RESCUE AND FIREFIGHTING

Airport Rescue and Firefighting (ARFF) requirements are outlined by FAA regulations. The Cottonwood Municipal Airport is not required to comply with the standards established in the Code of Federal Regulations 14, Part 139, that governs ARFF operations. These regulations are only applicable to airports that conduct certificated air carrier operations.

Currently, the procedure established for aircraft incidents/accidents at the airport is to utilize the City of Cottonwood fire fighting resources. The City should ensure that fire fighting personnel are specifically trained in aircraft accident procedures.

AIRPORT ACCESS

The Cottonwood Municipal Airport is accessible from Mingus Avenue off of State Route 89A. Mingus Avenue is a two lane paved street which dead ends approximately one mile east of the airport. State Route 89A is a four lane paved arterial, with access from the Cities of Cottonwood and Clarkdale.

Although the access at this time presents no existing access problems, future expansion of the commercial/industrial area around the airport could cause a need for additional access around the airport area. The access to the airport area should be monitored for future access restrictions and be addressed at that time.

UTILITIES

The existing airport utilities were evaluated to determine their adequacy to meet future demands of the airport and any projected on-airport development. It would appear that the airport has adequate utilities available, although this is dependent upon expansion of the facilities. This subject will be addressed again once the alternatives for future development have been evaluated and a future plan for the airport has been selected.

SUMMARY

The intent of this chapter is to outline the facilities required to meet aviation demands projected at Cottonwood Municipal Airport through the year 2015. A summary of the facility requirements are presented on **Exhibits 3B and 3C.**

The next step in the master planning process is to develop a direction for development to best meet these projected needs. The remainder of the master plan study will be devoted to outlining this direction, its schedule, and its associated costs.

91MP21-3B-7/21/83

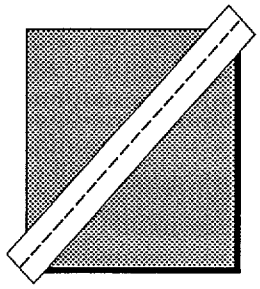
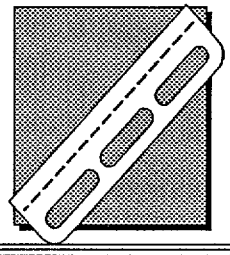
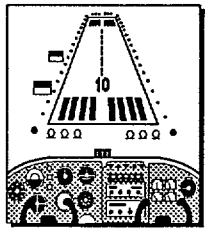
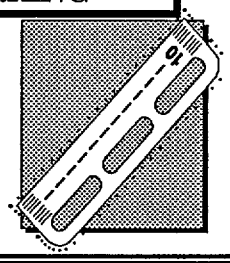
	EXISTING	SHORT TERM	ULTIMATE
RUNWAYS 	Runway 14-32 4,250' x 75' 30,000 lbs SWL	Runway 14-32 Same 12,500 lbs SWL	Runway 14-32 Same
TAXIWAYS 	Runway 14-32 Partial Parallel	Runway 14-32 Same	Runway 14-32 Relocate Parallel Taxiway
NAVIGATIONAL AIDS 	Runway 14-32 PAPI'S REILS - Rwy 32	Runway 14-32 REILS - Rwy 14	Runway 14-32 NDB
LIGHTING and MARKING 	Runway 14-32 MIRL Visual Marking	Runway 14-32 Same	Runway 14-32 Non-Precision Marking MITL

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Exhibit 3B
AIRSIDE FACILITY REQUIREMENTS

92MP21-3C-3/26/93

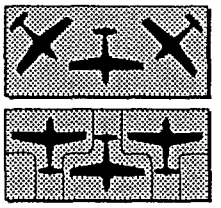
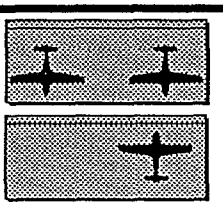
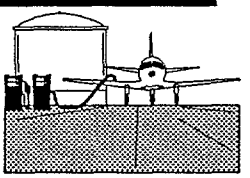
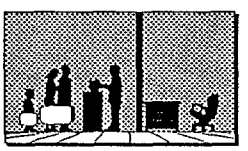
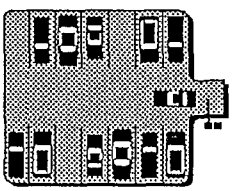
	EXISTING	1995	2005	2015
HANGARS				
	Conventional Hangars (Sq. Ft.) 2,400	1,700	5,600	12,400
	T-Hangars 0	6	9	11
	T-Shades 12	16	21	30
APRON TIE-DOWNS				
	Local Apron Positions 39	11	14	17
	Itinerant Apron Positions 4	11	17	26
	Total Apron Positions 43	22	31	43
FUEL STORAGE				
	Monthly Storage Requirements (Gallons) 10,000*	4,200	7,100	11,500
	*Available			
GENERAL AVIATION TERMINAL				
	Total Terminal Area (Sq. Ft.) 1,700*	950	1,400	1,900
	*Designed Size			
AUTO PARKING				
	Parking Spaces 11	20	31	45

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Exhibit 3C
LANDSIDE FACILITY REQUIREMENTS